



# PinPoint X HSUPA

## User Guide

20080311  
Rev 4.0

## Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless AirLink PinPoint X are used in a normal manner with a well-constructed network, the Sierra Wireless AirLink PinPoint X should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless AirLink PinPoint X, or for failure of the Sierra Wireless AirLink PinPoint X to transmit or receive such data.

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Do not operate the Sierra Wireless AirLink PinPoint X in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Sierra Wireless AirLink PinPoint X **MUST BE POWERED OFF**. When operating, the Sierra Wireless AirLink PinPoint X can transmit signals that could interfere with various onboard systems.

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*Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Sierra Wireless AirLink PinPoint X may be used at this time.*

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The driver or operator of any vehicle should not operate the Sierra Wireless AirLink PinPoint X while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

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5,515,013	5,629,960	5,845,216	5,847,553	5,878,234
5,890,057	5,929,815	6,169,884	6,191,741	6,199,168
6,339,405	6,359,591	6,400,336	6,516,204	6,561,851
6,643,501	6,653,979	6,697,030	6,785,830	6,845,249
6,847,830	6,876,697	6,879,585	6,886,049	6,968,171
6,985,757	7,023,878	7,053,843	7,106,569	7,145,267
7,200,512	D442,170	D459,303		

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	E-mail:	<a href="mailto:support@sierrawireless.com">support@sierrawireless.com</a>
Sales Desk:	Phone:	1-510-624-4200 1-604-232-1488
	Hours:	8:00 AM to 5:00 PM Pacific Time
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Post:	Sierra Wireless America 39677 Eureka Drive Newark, CA USA 94560  Sierra Wireless 13811 Wireless Way Richmond, BC Canada V6V 3A4	
Fax:	1-510-624-4299 1-604-231-1109	
Web:	<a href="http://www.sierrawireless.com">www.sierrawireless.com</a>	

Consult our website for up-to-date product descriptions, documentation, application notes, firmware upgrades, troubleshooting tips, and press releases:

[www.sierrawireless.com](http://www.sierrawireless.com)

## Revision History

Revision number	Release date	Changes
4.x	Q2: 2009	Guide updated with Release 4.0 content.

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# 1: Introduction to the PinPoint X

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The PinPoint X is a compact, intelligent and fully-featured mobile communications platform with multiple peripheral connections including serial, Ethernet and USB. Expanded I/O functionality in a separate connector includes four digital inputs, four analog inputs and two relay outputs unleashing extensive remote instrumentation possibilities.

Its high-precision 16-channel GPS receiver coupled with the rich embedded intelligence provided by ALEOS™ technology make PinPoint X the perfect choice for a broad set of mobile enterprise, public safety, fleet management and AVL solutions.



POWERED BY:  ALEOS

*Figure 1-1: Sierra Wireless AirLink PinPoint X*

## ALEOS™

ALEOS, the embedded core technology of the Sierra Wireless AirLink products simplifies installation, operation and maintenance of any solution, and provides an always-on, always-aware intelligent connection for mission-critical applications. ALEOS enables:

- Persistent Network Connectivity
- Over-The-Air (OTA) Upgrades
- Wireless Optimized TCP/IP
- Real-Time Notification
- Real-Time GPS Reporting
- GPS Store and Forward
- Packet Level Diagnostics
- Device Management & Control
- Protocol Spoofing



*Figure 1-2: Powered by ALEOS*

## ACEware™

A wireless solution is not complete until you have software tools to manage the devices monitoring your valuable equipment. Using the AirLink Control Environment (ACE), ACEWare is the device management and monitoring application suite for Sierra Wireless AirLink devices powered by ALEOS.



*Figure 1-3: ACEware Logo*

The ACEware suite encompasses an application internal to the firmware ( ACEmanager), Windows-based applications (ACEview and Modem Doctor), and a web-hosted application



(ACEnet). You can download the applications and their user guides from the Sierra Wireless AirLink Solutions web site: <http://www.sierrawireless.com/support>. Contact your dealer or Sierra Wireless representative for any further information.

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*Note: ACEview requires the Microsoft .NET Framework v. 2.0 and Microsoft Windows 98, Windows 2000, Windows XP, or later. You can obtain the Microsoft .NET Framework from Microsoft at: <http://www.microsoft.com/>.*

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ACEmanager, the AceWare remote configuration and monitoring tool, simplifies deployment and provides extensive monitoring, control and management capabilities. ACEmanager gives you the power to monitor and control your Sierra Wireless AirLink communications platforms in real-time.

### **Simplified Deployment**

ACEmanager provides the ability to remotely set up and configure your Sierra Wireless AirLink products. Remote device setup and configuration reduces the deployment timeline of your wireless solution and provides a quicker path to ROI.

Templates allow you to easily configure devices in your fleet with identical settings, ensuring a simple, accurate deployment.

### **Monitor and Control**

ACEmanager allows an administrator to remotely monitor a modem's status, health and configuration settings. The user interface displays signal strength, cell site information, byte counters and error conditions, enabling you to pinpoint any issues and troubleshoot immediately.

ACEmanager enables remote configuration and parameter settings to be changed or reset instantly over the air, change a device's port configuration, IP address settings, GPS settings, and much more. After configuring one modem, use the template feature to copy that device configuration to other devices.

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**Tip:** *Configuration steps and examples in this guide use ACEmanager.*

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ACEview is an efficient status and connection monitoring application with a low-profile, easy to read interface. In ACEview, you can also update PRL.

## Modem Doctor

Modem Doctor and Modem Doctor USB is a troubleshooting and diagnostics utility. This utility will allow you to get a log file of the PinPoint X activity which you can then send to Sierra Wireless support or erase the current configuration completely.

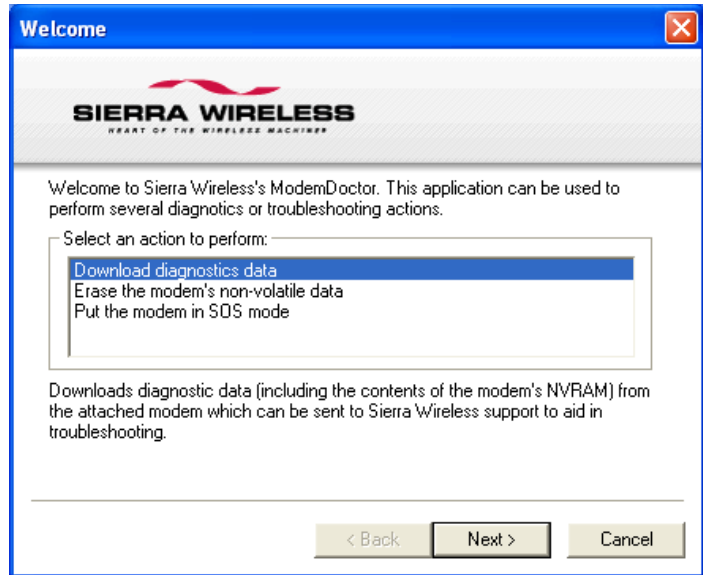


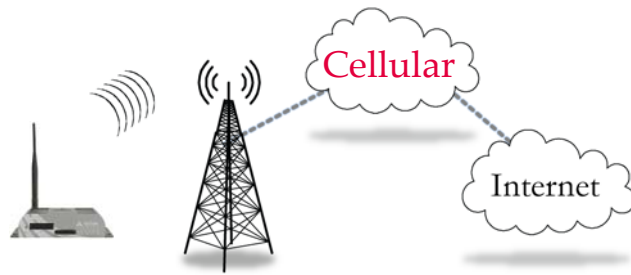
Figure 1-4: Modem Doctor

## Connecting to your cellular provider

The PinPoint X uses your cellular provider as an ISP (Internet Service Provider) to connect you to the Internet.

### Steps of a connection:

1. When your PinPoint X is powered on, it automatically searches for cellular service using HSUPA/HSDPA.
2. Your PinPoint X establishes a PPP (Point to Point Protocol or "dial" up connection) link to the your cellular provider network, also called registering on the network, and receives an IP address.
3. When your PinPoint X has received its IP address from your cellular provider, a connection to the Internet or the cellular network is also available for computers or other devices connected directly to the PinPoint X.



The PinPoint X will perform routing for all internet traffic to and from the computers or other end device.

With the Raven XE in Ethernet Public mode, only one device connected to the Ethernet port will receive the public IP address which is the one provided by the cellular network. In Ethernet Private mode, with a hub or switch connected to the Ethernet port, the Raven XE will provide NAT for a range of computers or other devices connected to the switch or hub and Internet access to all of them.

### Dynamic vs. Static IP Addresses

There are two types of addresses on networks: dynamic and static.

- Dynamic addresses are assigned on a “need to have” basis. Your PinPoint X might not always receive the same address each time it connects with your cellular provider.
- Static addresses are permanently assigned to a particular account and will always be used whenever your PinPoint X connects to the Internet. The IP address will not be given to anyone else.

Most ISPs (cellular included) use dynamic IP addresses rather than static IP addresses since it allows them to reuse a smaller number of IP addresses for a large number of customers. A dynamic IP address is suitable for many common Internet uses, such as web browsing, looking up data on another computer system, or other client functions (such as data only being sent out or only being received after an initial request).

---

**Tip:** *If your account with your cellular provider includes a dynamic IP address and you need a static IP, please consult your cellular provider Representative for more information about changing your account for static IP support.*

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If you need to contact your PinPoint X, a device connected to the PinPoint X, or a host system using the PinPoint X from the Internet, you need to have a known IP (such as one which is static) or domain name (an IP address which is converted by a DNS server into a word based name). If you have a dynamic IP address for your modem, you can use a Dynamic DNS service (such as IP Manager) to translate your IP address into to a domain name.

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**Caution:** *If you want to connect remotely to your PinPoint X using TCP/IP, the IP address given to your modem by your cellular provider cannot be a private or internal IP address (such as a special private network) unless you are on the same network or inside that network's firewall (such as with frame relay).*

---

## Communication HSUPA

Many of the GSM Networks have been expanded to HSUPA.

### HSUPA

HSUPA (High-Speed Uplink Packet Access) is a cellular technology which most closely resembles a broadband synchronous connection. The upload and download speeds are maximized to provide a faster throughput, reaching speeds up to 2.0 Mbit/s for the uplink and 7.2 Mbit/s for the downlink.

Please check with your network provider on the availability of HSUPA.

### HSDPA

HSDPA (High-Speed Downlink Packet Access) is a cellular technology allowing for higher data transfer speeds. In HSDPA mode of operation, max speeds are up to 7.2 Mbit/s in the downlink and 384 kbit/s in the uplink. HSDPA uses Adaptive Modulation and Coding (AMC), fast packet scheduling at the Node B (Base Station) and fast retransmissions from Node B (known as HARQ-Hybrid Automatic Repeat Request) to deliver the improved downlink performance vs. UMTS and EDGE.

HSPDA (and HSUPA) falls back to UMTS, EDGE or GPRS (in order of precedence). This feature allows you to have seamless connectivity no matter where your PinPoint X is.

### **UMTS**

UMTS (Universal Mobile Telecommunications System) supports up to 1920 kbit/s data transfer rates, although most users can expect performance up to 384 kbit/s. A UMTS network uses a pair of 5 MHz channels, one in the 1900 MHz range for uplink and one in the 2100 MHz range for downlink.

### **EDGE**

EDGE (Enhanced Data rates for GSM Evolution) provides end-to-end packet data services with an enhanced connectivity building on GPRS technology and using the established GSM networks. EDGE provides higher transmission rates and better transmission quality for data than GPRS. EDGE can carry data at speeds typically up to 384 kbit/s in packet mode.

When EDGE is not available, your PinPoint X will fall-back to GPRS for the connection to your cellular provider to provide continued connectivity.

### **GPRS**

General Packet Radio Service (GPRS) is packet-switched with many users sharing the same transmission channel, but only transmitting when they have data to send. This means that the total available bandwidth can be immediately dedicated to those users who are actually sending at any given moment, providing higher utilization where users only send or receive data intermittently. GPRS provides speeds of 30–70 kbps with bursts up to 170 kbps.

## **Connection methods**

You can connect the PinPoint X to a USB or a Ethernet (RJ45) on a computer. When connected to a USB or Ethernet port, the PinPoint X behaves like a network card.

### **USB**

The PinPoint X is equipped with a USB port which increases the methods by which you can send and receive data. The USB port can be set to work as either a virtual Ethernet port or a virtual serial port. A driver installation is required to use the USB port in either mode.

It is recommended that you use a USB 2.0 cable with your PinPoint X and connect directly to your computer for best throughput.

## Virtual serial port

The PinPoint X supports one virtual serial port over USB. This VSP can be used, for example, to send AT commands, or to run many serial based applications such as HyperTerminal®.

## Networking

### IPSec

The IP protocol that drives the Internet is inherently insecure. Internet Protocol Security (IPSec), which is a standards-based protocol, secures communications of IP packets over public networks.

IPSec is a common network layer security control and is used to create a virtual private network (VPN).

The advantages of the IPSec feature includes:

- **Data Protection:** Data Content Confidentiality allows users to protect their data from any unauthorized view, because the data is encrypted (encryption algorithms are used).
- **Access Control:** Access Control implies a security service that prevents unauthorized use of a Security Gateway, a network behind a gateway or bandwidth on that network.
- **Data Origin Authentication:** Data Origin Authentication verifies the actual sender, thus eliminating the possibility of forging the actual sender's identification by a third-party.
- **Data Integrity:** Data Integrity Authentication allows both ends of the communication channel to confirm that the original data sent has been received as transmitted, without being tampered with in transit. This is achieved by using authentication algorithms and their outputs.

The IPSec architecture model includes the Sierra Wireless AirLink gateway as a remote gateway at one end communicating, through a VPN tunnel, with a VPN gateway at the other end. The remote gateway is connected to a Remote network and the VPN is connected to the Local network. The communication of data is secure through the IPSec protocols.

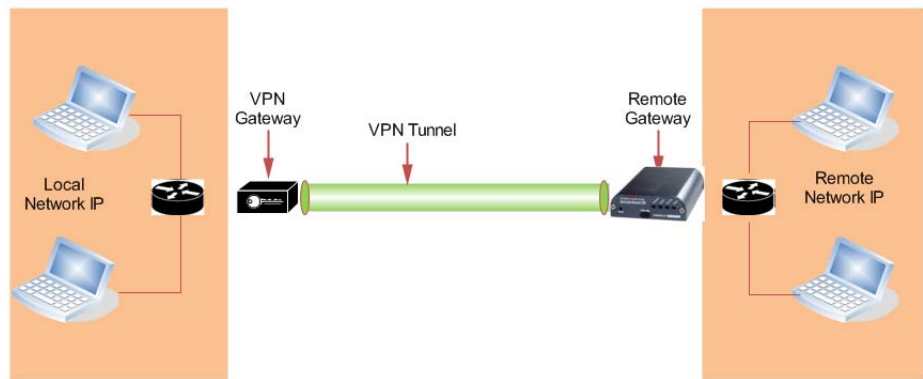


Figure 1-5: IPsec Architecture

## GRE

GRE (Generic Routing Encapsulation) tunnel is used to carry non-IP packets through an IP Network. Non-IP packets, that are send over the GRE tunnel, need to be first encapsulated. Hence, ALEOS is used to configure and encapsulate non-IP packets and transmit over IP through the GRE tunnel.

## Applications

### Events Reporting

Events Reporting is Sierra Wireless AirLink's modem's new software feature provided via ACEmanager, that allows the users to generate reports from the events that take place. Event Reporting Protocol is an intuitive embedded protocol, which automatically formats the messages based on an event trigger. The messages generated are then reported to the remote server.

## Software

The PinPoint X modem comes with the following software:

- ACEview, the software for the PinPoint X which allows you to monitor your connections.
- The driver that forms the interface between the PinPoint X and your Windows operating system when using USB virtual Ethernet or USB virtual serial.
- The firmware that is stored in non-volatile memory and includes ACEmanager.

The PinPoint X has an embedded radio module, also made by Sierra Wireless, Inc. There are two firmware programs on the device—one stored on the controller board of the PinPoint X and one on the radio module.

The firmware was loaded into the radio module and controller board when the PinPoint X was assembled. As new versions of the software and firmware are released, they are posted at [www.sierrawireless.com](http://www.sierrawireless.com).

## Documentation

This *PinPoint X User Guide* describes how to:

- Install the PinPoint X hardware.
- Connect the radio antennas.
- Connect a notebook computer and other input/output (I/O) devices.
- Interpret the LEDs on the PinPoint X and the indicators in the ACEview software.

This *User Guide* is provided as a PDF (Portable Document Format) file on the installation CD or from the Sierra Wireless support website.

## Tools and Reference Documents

User Guide	Description
<b>ALEOS User Guide</b>	This document discusses software configuration in ACEmanager and about the explains different ALEOS features.
<b>ACEview User Guide</b>	This document explains the use of this utility tools which is used to view and monitor the connection state of a Sierra Wireless AirLink device.
<b>ACEnet User Guide</b>	This document explains the use of ACEnet services for remote management of Sierra Wireless AirLink device.



## 2: Specifications

- Interface Port Pin-Outs
- Power Connector

### Features and Benefits

- Embedded Intelligence
- Low Power Consumption
- High-Speed Processor
- High-Speed 2-way Data
- Multiple Interfaces, I/O Port
- High-Sensitivity GPS Receiver
- Persistent Network Connectivity
- Remote Management and Configuration
- Extensive Vehicle Telemetry
- Integrated with 3rd Party Tracking Applications
- Rugged for Extreme Environments

### Technology

- HSUPA  
With Fallback to:
  - HSDPA
  - UMTS
  - EDGE
  - GPRS (MS-12)
  - GSM

### Bands

- TriBand for UMTS/HSDPA/HSUPA
  - 850/1900/2100 MHz
- Dual Band diversity for HSUPA, optimized by region
  - Europe: 850/2100MHz
  - North America: 850/1900 MHz
- Quad Band GSM/GPRS
  - 850/900/1800/1900 MHz

### Environmental

- Operating Temperature:
  - -30° to 70° Celsius
- ° Storage Temperature:
  - -40° to 85° Celsius

**Power Consumption: (@12V DC)**

- Transmit/Receive (Typical/Max) 300/520 mA
- Idle 170 mA
- Low Power Mode 80 mA
- Input Voltage 9 - 28V DC

**Standards/Approvals**

- Carrier specific approvals
- CE
- FCC
- PTCRB
- Industry Canada

**Host Interfaces**

- Ethernet: 10/100 Mbps RJ-45
- USB Type B
- RS-232: DB-9 DCE (300-230400 baud)
- I/O: 4 Digital, 4 Analog, 2 Relay
- Antenna Connection:
  - Cellular - 50 Ohm TNC
  - GPS - 50 Ohm SMA

---

**Warning:** *The antenna should be installed no closer than 20 cm from the human body. It is one of the RSS-102 requirements for devices not requiring SAR.*

---

**Dimensions**

- 162mm x 40mm x 109mm
- 612 grams

**Application Interfaces**

- TCP/IP, UDP/IP, DHCP, HTTP, SNMP, SMTP, SMS, MSCI, NMEA, TAIP, GPS, and more

**LED Indicators**

- Network
- Signal
- Activity
- Service
- GPS

- Power

## Interface Port Pin-Outs

### Serial Port

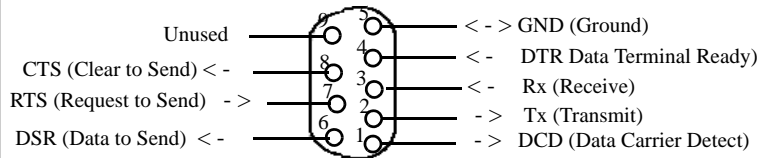


Figure 2-1: Serial Port Diagram: Female DB-9 DCE (not to scale)

### I/O Port

*Note: The Pin-Out diagram shows external view looking at PinPoint X connector in front face-plate of device. Pin 1 is lower right.*

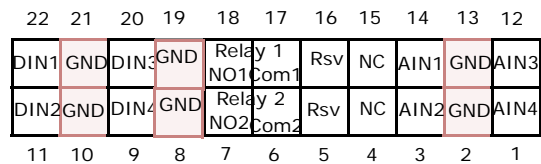
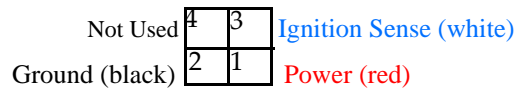


Figure 2-2: PinPoint X I/O Port Diagram (not to scale)

<b>1.</b> Analog Input 4	<b>12.</b> Analog Input 3
<b>2.</b> Analog Ground	<b>13.</b> Analog Ground
<b>3.</b> Analog Input 2	<b>14.</b> Analog Input 1
<b>4.</b> No Connect	<b>15.</b> No Connect
<b>5.</b> Reserved for future use	<b>16.</b> Reserved for future use
<b>6.</b> Com2 (for use with #7)	<b>17.</b> Com1 (for use with #18)
<b>7.</b> Normal Open Relay	<b>18.</b> Normal Open Relay
<b>8.</b> GND	<b>19.</b> GND
<b>9.</b> Digital Input 4	<b>20.</b> Digital Input 3

<b>10.</b> Ground	<b>21.</b> Ground
<b>11.</b> Digital Input 2	<b>22.</b> Digital Input 1

## Power Connector



*Figure 2-3: Power Connector (not to scale)*

## 3: Activating PinPoint X on your cellular provider

- Installing the SIM
- Configuring the APN

This chapter provides step-by-step directions for activating your PinPoint X on your cellular provider's network.

### Installing the SIM

The Subscriber Identity Module (SIM) in the PinPoint X is a smartcard that securely stores the key identifying a cellular subscriber. Generally, you will only need to install a SIM once in the life of the modem and it may be pre-installed by your Sierra Wireless Representative.

#### 1. Before you start

If the SIM was pre-installed, unless you need to set a custom APN, activation of your modem is complete.

##### Cellular Account Required

- **Cellular Account Required**- To use your modem, you need to have a SIM with an active account with your cellular provider.

##### Software Required

- **ACEmanager** - Graphical interface for entering most AT Commands. You can download ACEmanager from the Sierra Wireless AirLink Solutions website: <http://www.sierrawireless.com/support/>. A default installation of this utility is assumed later in these directions

##### Hardware Required

- **Ethernet cable or serial cable** - An Ethernet cable or straight through serial cable.
- **Serial cable** - A straight through serial cable.

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*Note: Until you install a driver for the USB port, you cannot use your USB port to configure the modem.*

---

- **Power adapter and a power source** - You will need a power supply and power source for the modem.

- **PC or laptop** - To configure the modem, you will need a computer with an available Ethernet port or serial port.

**Tools Required**

- **Small Phillips screw driver** - The Phillips screw driver is the one which is also called a plus (+) or X screw driver.
- **Slim stylus** - A PDA stylus, an unbent paperclip, or other such item.

**2. Opening the SIM Slot**

- a. Unplug the PinPoint X power and all cables.
- b. Remove slot cover on the front of the PinPoint X to reveal the SIM slot.



Figure 3-1: Slot Cover

**3. Remove the SIM from the card**

- a. Carefully remove the SIM card from the card you received from your cellular provider.

**4. Ejecting the SIM tray**

- a. Using the tip of a PDA stylus, an unbent paperclip, or other slim blunt item press the yellow button of the SIM tray.

---

**Tip:** The button is between two boards.

---

- b. Slide the tray out completely.



Figure 3-2: SIM tray button

c.

## 5. Insert the SIM into the Tray

- a. Place the SIM into the tray and gently press to click it into place.



Figure 3-3: Empty SIM Tray and a Tray with a Sample SIM

## 6. Insert the Tray and SIM

- a. Slide the tray back into the modem.
- b. Gently press the SIM to click it into place.

---

**Tip:** *The top of the card faces the bottom of the modem.*

---



Figure 3-4: Inserting the SIM

## 7. Finishing the SIM installation

Replace the cover to prevent dust or other unwanted particles from entering the PinPoint X. Once the cover is replaced, the installation is complete.

---

*Note: The first time you power on your PinPoint X with your new SIM, there may be a delay of up to 10 minutes for the initial network connection to occur.*

---

## Configuring the APN

The APN (Access Point Name) is the way your device knows how it will be communicating with the network. The APN allows custom IP addressing and tailoring your company's wireless IP solution to meet the security and IP addressing requirements of your applications.

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*Note: Most accounts use the default addressing solution of Private or Public IP addresses supplied by the Internet and Proxy APNs. Only if you have a Static or Custom IP address should you need to configure a custom APNs.*

---

The default APN is *Internet*. If you need a different APN, use ACEmanager to configure it.



## 4: Hardware Installation of the PinPoint X

- Connecting to Power
- Connecting to a Computer or other Device
- Indicator Lights
- Mounting

*Note: During installation, please be sure that the cables are secure but do not bear any additional weight that could loosen the connector from the unit.*

Your PinPoint X should be mounted in a position that allows easy access for the cables so they are not bent, constricted, in close proximity to high amperage, or exposed to extreme temperatures. The LEDs on the front panel should be visible for ease of operational verification. You should ensure that there is adequate airflow around the modem but that it is kept free from direct exposure to the elements, such as sun, rain, dust, etc.

**Caution:** *The PinPoint X is in a hardened case and designed for use in industrial and extreme environments. However, unless you are using cables expressly designed for such environments, they can fail if exposed to the same conditions the PinPoint X can withstand.*

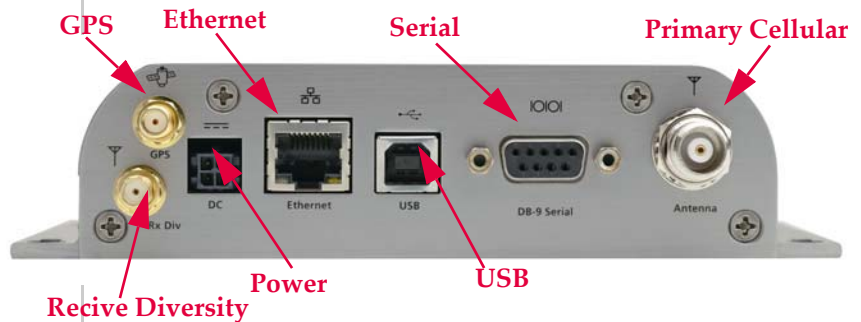


Figure 4-1: PinPoint X Connectors

*Note: This device is not intended for use within close proximity of the human body. Antenna installation should provide for at least a 20 CM separation from the operator.*

Antennas selected should not exceed a maximum gain of 5 dBi under standard installation configuration. In more complex installations (such as those requiring long lengths of cable and/or multiple connections), it's imperative that the installer follow maximum dBi gain guidelines in accordance with the

radio communications regulations of the Federal Communications Commission (FCC), Industry Canada, or your country's regulatory body (if used outside the US).

Your PinPoint X will work with most cellular antennas with a connector. Connect the primary antenna or primary RF cable directly to the antenna connector on the back of the PinPoint X.

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**Tip:** *When using a cable to an antenna placed away from the modem, minimize the length of your cable. All gain from a more advantageous antenna placement can be lost with a long cable to the modem.*

---

GPS Antenna

Your PinPoint X will work with most standard active GPS antennas. Connect the GPS antenna or cable directly to the threaded SMA connector.

Mount the GPS Antenna in the vehicle. The less the cable is wrapped and bound together, the better it will perform. Place it on the roof, or on the dash, or rear panel where it has a good view of the sky (greater than a 90 degree view of the sky).

There are three options for antenna mounts:

- Magnetic roof-mount
- Through glass-mount
- Permanent mount

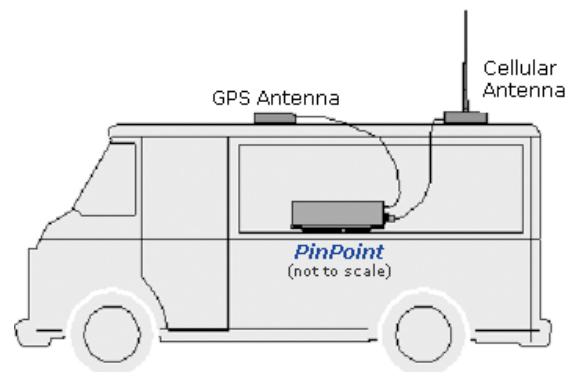


Figure 4-2: GPS Antenna Placement for a Vehicle

## Connecting to Power

Your PinPoint X can be used with either DC or AC, with the appropriate power adapter. DC cables and AC adapters are available as optional accessories in addition to the one included with your PinPoint X.

The DC power cable positive lead should be connected to the battery or power source positive terminal. The power cable negative lead should be connected to the battery or power source negative terminal.

The battery cable used for a car, truck, or other mobile connection must be less than 3 meters in length.

The PinPoint X has an internal polysilicon circuit breaker that opens at 0.5 to 1.0 amps of current.

If you wish to use the Standby Ignition Sense (SISE) feature of your PinPoint X, the white wire of the three wire DC power cable should be used to connect to your ignition. When SISE is enabled in the modem and the ignition sense connector is wired to your vehicle, the ignition sense will provide a link to the modem to enable it to enter a low-power, standby mode when your vehicle is turned off and power up more quickly when the ignition is started.

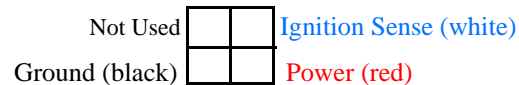


Figure 4-3: Ignition Sense power connector

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**Warning:** *Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.*

---

## Connecting to a Computer or other Device



Figure 4-4: Ethernet

The Ethernet port of your PinPoint X can be connected directly to a computer or other Ethernet device with either a cross-over cable or a straight-through cable. The Ethernet port on the PinPoint X is auto-sensing and will auto-detect the speed of the connecting device for 100baseTX or 10baseT. If you are connecting the modem to a hub or switch you should use a straight through cable or use the uplink port on the hub or switch with a cross-over cable.



*Figure 4-5: Serial*

The serial port of your PinPoint X can be connected directly to most computers or other devices using a standard straight through cable. If you have a DCE device, you will need a null modem or null modem cable.



*Figure 4-6: USB*

Your PinPoint X's full-speed (12 Mbit) USB 2.0 port can be connected directly to most computers or other devices using a standard full-speed USB 2.0 cable. If the computer or device you are connecting or the cable is not rated for full-speed, the modem will communicate at a reduced speed to match. The PinPoint X functions as a device, not a host.

When it is connected to a computer, the USB port should be seen as a COM port or Ethernet port after the applicable driver is installed.

The PinPoint X has a standard B connector.



*Figure 4-7: I/O*

Your PinPoint X also has an I/O port with digital inputs, analog inputs, and relay outputs which can be connected to external devices.

The I/O port can use an optional I/O harness available through Sierra Wireless.

## Indicator Lights

When your PinPoint X is connected to power and an antenna, there is a specific pattern to the lights to indicate its operation mode.



Figure 4-8: PinPoint X Indicator lights

- **Network** - Indicates a successful connection to the cellular network with an IP address given and a channel acquired.
- **Signal** - Light shows the strength of the signal and may be nearly solid (strong signal) or flashing (weaker signal). A slow flash indicates a very weak signal.

### RSSI LED Ranges

RSSI/Signal LED Status	Ranges of RSSI (dBm)
On Solid	Equal to or stronger than -69
Fast Blink	-70 to -79
Normal blink	-80 to -89
Slow Blink	-90 to -99
Extinguished	Equal to or weaker than -100

- **Activity** - Lights will flash as data is transferred to and from the PinPoint modem on the remote network.
- **Service** - Indicates when the connection is HSUPA/HSDPA or UMTS. Unlit indicates EDGE or GPRS.
- **GPS** - Indicates a GPS fix. When lit, the PinPoint X has GPS coordinates to report.
- **Power** - Indicates the power adapter is connected and there is power getting to the PinPoint X.
- The **Reset button** (on the left side of the PinPoint X) has two functions. If it is quickly depressed and released, the modem will simply power cycle the internal hardware. If, however, the reset is depressed and held for several

seconds (count 10 slowly, and wait for the power light to go off after the light pattern stops), the ALEOS configuration settings will return to the factory defaults.

---

**Caution:** *If you reset the modem configuration using the reset button, you may to reconfigure your APN.*

---

### Light Patterns

The LEDs on the front of the modem will respond in different patterns to indicate modem states.

- **Normal** - Each LED, mentioned above, is lit as applicable.
- **Start up** - The LEDs will cycle from left to right.
- **PassThru mode** - Network and Signal LEDs will blink in tandem. The Activity LED will blink when transmitting or receiving data.
- **SOS** - The Network Channel and Service Err or Service LEDs will blink alternate to each other.
- **Low Power** - All LEDs will be off except the power LED which will blink every 3 seconds.
- **Configuration Reset** - The LEDs will cycle left to right and then right to left 4 times.
- **Authentication Failure** - The Network, Signal, and Activity LEDs blink every 2 seconds.
- **Data Retry** - The Network, Signal, and Activity LEDs blink every 3 seconds.
- **Invalid MAC Address or Ethernet Initiation Fail** - The Service LED will blink.

## Mounting

The integrated mounting with keyhole screw mounts on the PinPoint X will allow you to secure your modem nearly anywhere, quickly and easily, without the need for a separate bracket.

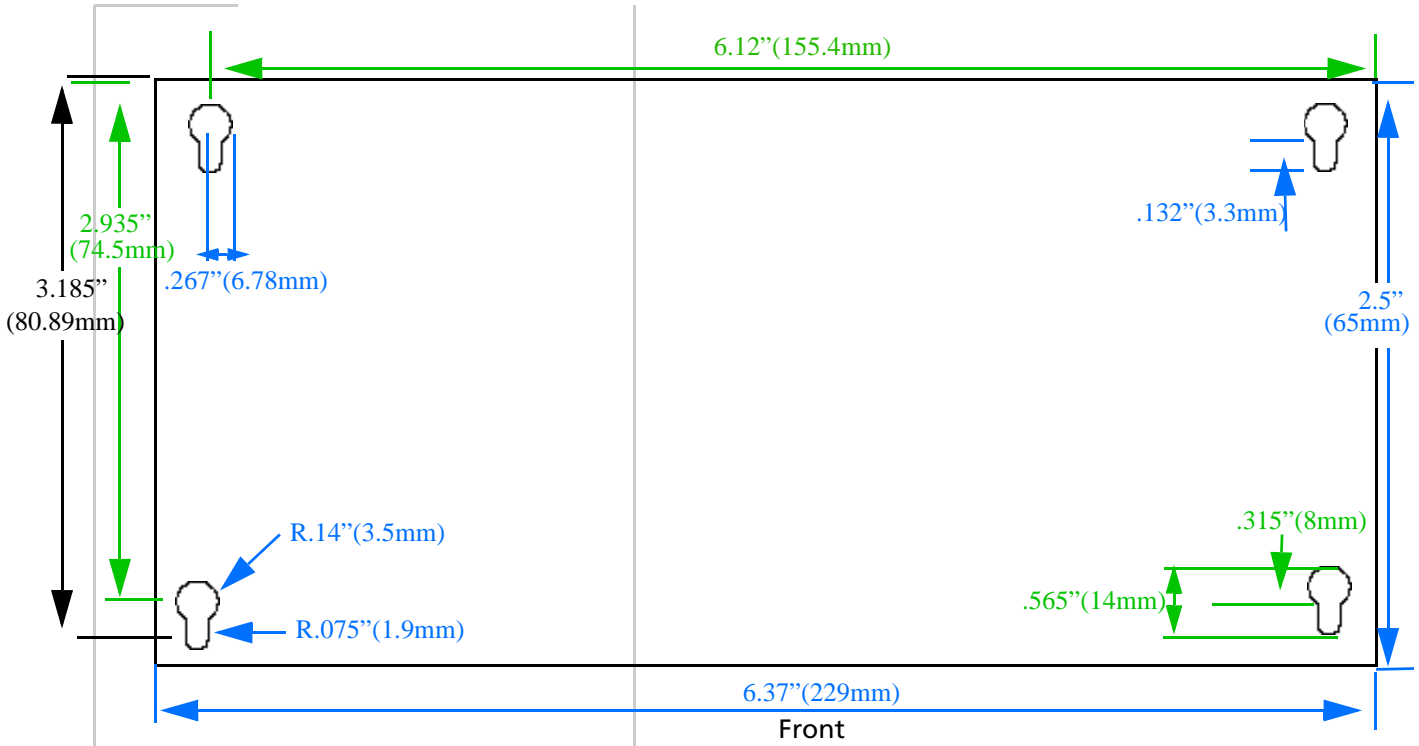


Figure 4-9: Diagram of the PinPoint X base

## 5: Inputs, Relay Outputs, and Power Status

- Capturing External Events
- Power Modes and Information

The PinPoint X has special features for use in a mobile environment. The PinPoint X can be configured to monitor the input, respond to specific types of events, and even trigger a digital output. The PinPoint X can also be configured to change its power mode in order to conserve power. These features can be configured to your needs.

### Capturing External Events

The PinPoint X is equipped with an I/O port interface which includes 4 digital inputs, 4 analog inputs, and 2 relay outputs. These may be connected to sensors and switches to monitor vehicle status and remotely control equipment.

*Figure 5-1: PinPoint X I/O port*

#### Analog Inputs

The analog inputs will report a specific voltage ranging from 0 to 30 in increments of 0.03 volts. This allows a fine degree of monitoring for a scaling device.

- Monitoring a voltage or power usage.
- Monitoring an oscilloscope.
- Monitoring temperature.
- Monitoring an incremental gauge.
- Monitoring an internal fan.
- Monitoring a vehicle payload.
- Monitoring the elevation of a tow bar.
- Monitoring a vehicle's battery use.



## Digital Inputs

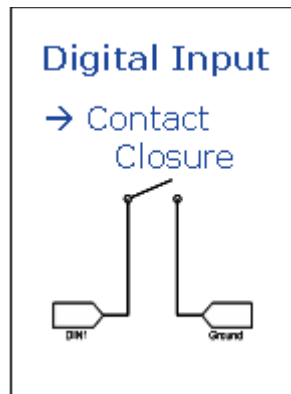


Figure 5-2: Digital Input Contact Closure

By measuring contact closures on switches, the digital inputs can report a simple open or closed state. Each of the four digital inputs can be wired to the two ground signals via a switch. When the switch is open, the input will read "OPEN". When the switch is closed and the input is connected to ground, the input will read "CLOSED".

- When a door or other latch is opened or closed.
- Counting pulses or other electronic events.
- When a gauge reaches a certain point.
- When a container fills or empties.
- When a switch or valve is opened or closed.
- When the tow bar is raised or lowered.
- Connected to a sensor, the level of fuel in a vehicle.
- When the trunk of a vehicle is opened or closed.
- When the ignition is turned on or off.

## Relay Outputs

As an electronic switch which can be opened or closed (Normally Open relay), a relay can be used to transmit an action to another device by signalling to that other device an "on" or "off". As a Normally Open relay, the circuit of the relay is disconnected (open) unless it is active. When the relay is active, the circuit is connected (closed).

- Setting off an alarm or siren.
- Triggering a process to start on another device.
- Opening or closing a valve or switch.
- Locking or unlocking a door.
- Turning a light on or off.
- Opening the vehicle's trunk or doors.

**Tip:** The relays are only capable of switching small loads. If you need a stronger signal, such as to open a door lock, you can connect the PinPoint X's relay to a stronger solenoid relay which has enough power to cause the desired effect.

*Note: Before you install the PinPoint X in its final location, be sure to cover all exposed wiring.*

### Connecting devices to the I/O Port

You can purchase an optional I/O Wiring Harness for the PinPoint X which can be used to attach devices to the I/O port. The harness has pre-wired leads to allow you to customize your own connections. The wires are paired and color-coded.

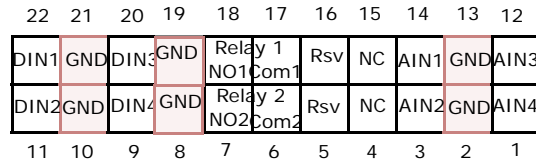


Figure 5-3: PinPoint X I/O Port Diagram (not to scale)

**Table 5-1: PinPoint X I/O Port Pin-out**

<b>1.</b> Analog Input 4	<b>12.</b> Analog Input 3
<b>2.</b> Analog Ground	<b>13.</b> Analog Ground
<b>3.</b> Analog Input 2	<b>14.</b> Analog Input 1
<b>4.</b> No Connect	<b>15.</b> No Connect
<b>5.</b> Reserved for future use	<b>16.</b> Reserved for future use
<b>6.</b> Com2 (for use with #7)	<b>17.</b> Com1 (for use with #18)
<b>7.</b> Normal Open Relay	<b>18.</b> Normal Open Relay
<b>8.</b> GND	<b>19.</b> GND
<b>9.</b> Digital Input 4	<b>20.</b> Digital Input 3
<b>10.</b> Ground	<b>21.</b> Ground
<b>11.</b> Digital Input 2	<b>22.</b> Digital Input 1

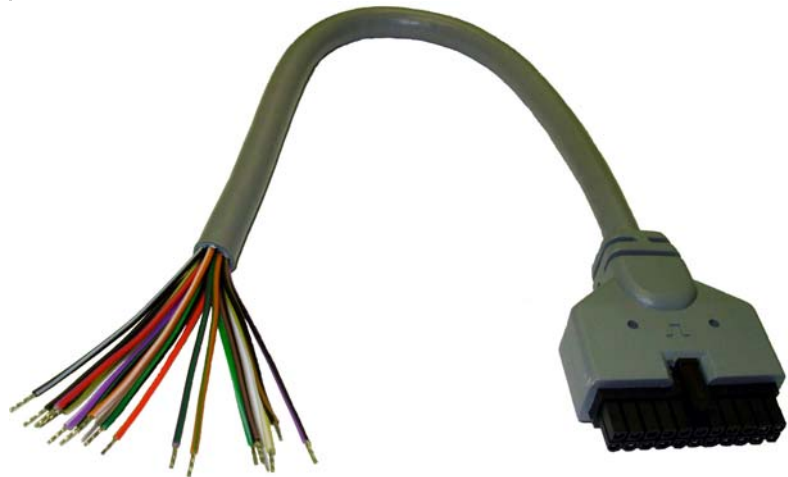


Figure 5-4: I/O Wiring Harness, AirLink part number 120-140-1014

← Locking Tab

22	21	20	19	18	17	16	15	14	13	12
O/W	Bl/Br	O/Bl	none	G/Bl	G/W	none	none	V/W	Bl/W	V/Bl
O/G	Bl/G	O/R	none	Y/Bl	Y/W	none	none	V/G	Bl/R	V/R
11	10	9	8	7	6	5	4	3	2	1

Figure 5-5: Color Corospondance to connection points

**Table 5-2: Wiring Color Corospondance**

<b>1.</b> Violet/Red	<b>12.</b> Violet/Black
<b>2.</b> Black/Red	<b>13.</b> Black/White
<b>3.</b> Violet/Green	<b>14.</b> Violet/White
<b>4.</b> none	<b>15.</b> none
<b>5.</b> none	<b>16.</b> none
<b>6.</b> Yellow/White	<b>17.</b> Green/White
<b>7.</b> Yellow/Black	<b>18.</b> Green/Black
<b>8.</b> none	<b>19.</b> none
<b>9.</b> Orange/Red	<b>20.</b> Orange/Black
<b>10.</b> Black/Green	<b>21.</b> Black/Brown
<b>11.</b> Orange/Green	<b>22.</b> Orange/White

---

*Note: The Pin-Out diagram shows external view looking at PinPoint X connector in front face-plate of device. Pin 1 is lower right.*

---

### **Analog Inputs**

Connect a wiring lead to an analog input (AIN) at 1, 3, 12 or 14, and the nearest ground at 2 or 13.

### **Digital Inputs**

Connect a wiring lead to a digital input (DIN) at 9, 11, 20, or 22, and the nearest ground at 8, 10, 19, or 21, as applicable.

---

**Caution:** *Never apply voltage to the Digital inputs. The inputs can only be switched open or closed to ground.*

---

### **Relay Outputs**

Connect the circuit leads to one of the two relay pairs at 6 and 7 or at 17 and 18.

## **Monitoring and Setting the I/O**

You can monitor the status of both the digital and analog inputs using ACEmanager or AT Commands and also with special reports sent using RAP. In ACEmanager, select the I/O group.

You can monitor the status of the relays or set them using ACEmanager, I/O group, or AT Commands.

### **Getting Immediate Reports Using RAP**

You can set up the PinPoint X to report immediately report the state of an input when it changes by using \*PPFLUSHONEVT. You will also need \*PPINPUTEVT, input event reports, enabled and a server configured for your RAP reports. These settings are in the PinPoint group in ACEmanager.

## **Power Modes and Information**

The PinPoint X can be configured to switch power modes in response to specific events, such as when the voltage to the modem drops below a configured threshold or when the DTR changes, in order to conserve a vehicle's battery life. The stand-

by state, low-power mode, will prevent the modem from draining the battery while allowing the modem to quickly power up to regular operation when it is needed.

You can configure Low Power mode using ACEmanager.

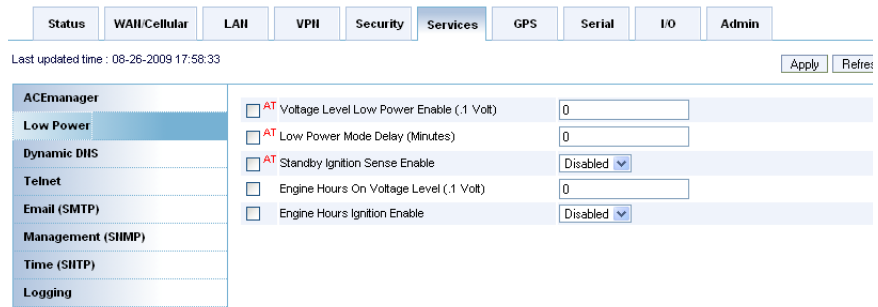


Figure 5-6: ACEmanager : Low Power

## Wiring the PinPoint X for

When the Standby Ignition Sense is enabled and the ignition sense connector is wired to your vehicle, the ignition sense will provide a link to the modem to enable it to enter a low-power using standby mode.

The white wire of the three wire connector should be used to connect to your ignition.

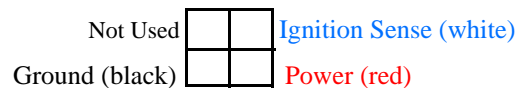


Figure 5-7: Ignition Sense Power Connector

## Power Effect on Modem State

Once the transition from powered on to standby, low-power mode starts, the modem will change state to AT mode. This results in the current mode being gracefully terminated. For the brief period when the modem is preparing for low-power mode, the modem will remain in AT mode. At that time, it won't auto-answer, ATD will fail, etc. Once low-power mode is entered, the modem will then discard any data received on the host port.

When the modem is woken from low-power mode, the same behavior occurs as upon power on. The modem starts in AT mode, and then after 5 seconds will enter the default start-up mode as it is configured for the modem.

### Monitoring Power-In Voltage

The current status of the power-in voltage can be monitored in ACEmanager.

